

REMARKS

This paper responds to the Office Action mailed on March 20, 2007.

Claims 1, 8, 12 and 13 are amended, no claims are canceled, and claims 63-70 are added. No new matter has been introduced through the presentation of claims 63-70. Accordingly, claims 11-13, 52-53 and 60-70 are now pending in this application.

Applicant informs the examiner that a further member of the present family of applications, specifically serial no. 11/460,021, has now published as 2006/0258113A1 (no USPTO action has been received to date).

§102 Rejection of the Claims

Claims 1-4, 8-13, 60 and 61 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,362,068 to Summerfelt, *et al.* (hereinafter, “the Summerfelt reference”). Applicant disagrees with the stated grounds of rejection and desires to further clarify various distinctions of the present invention over the cited art. Reconsideration of the present application is therefore requested in light of the present amendments and following remarks.

The Examiner is reminded that, in general, for a reference to be anticipatory, all elements of the claim must be present, either explicitly or inherently, in a single prior art reference. In rejecting claims under 35 U.S.C. §102(e), the Examiner admits that the Summerfelt reference fails to disclose: “...at least two layers of said dielectric layer...exhibit[ing] different degrees of oxidation.” (Office Action, at page 3). The Examiner further admits that: “Summerfelt fails to expressly disclose wherein said second dielectric layer has a lower oxygen concentration than said first dielectric layer or wherein said layers exhibit different amounts of oxygen per unit volume.” (*ibid.*, at page 3).

Although the Applicants generally agree with the Examiner’s foregoing observations regarding the teachings missing from the Summerfelt reference, Applicants nevertheless disagree with the Examiner’s suggestion that an inherent teaching is present. For example, the Examiner submits that: “...the recitation of a lower degree of oxidation is seen to be a recitation of a greater concentration of free metal with respect to another layer with a lower concentration of free metal.” (*ibid.*, at page 3). Accordingly, Applicants understand the Examiner to assert that a reciprocal correspondence obtains between an oxidation level in a selected layer and the

concentration of a free metal in the layer. In response, Applicants submit that this alleged correspondence is neither explicitly or inherently taught in the Sommerfelt reference. Moreover, Applicants fail to understand where this alleged reciprocal correspondence is to be found at all. Consequently, Applicants respectfully maintain that the Examiner's stated position is not based upon any evidence presently of record.

Turning now to the claims, distinguishing differences between the Sommerfelt reference and the claim language will be specifically pointed out. Claim 1, as amended, recites in pertinent part: "A substrate assembly, comprising... a plurality of high-K dielectric layers over said support surface, wherein a common metal is present in at least two adjacent layers of said plurality, *and wherein at least two layers of said plurality exhibit different degrees of oxidation so that at least one layer of the plurality of high-K dielectric layers manifests greater oxidation than would an equivalent thickness of an underlying layer of the plurality.*" (Emphasis added). Applicants cannot find any corresponding teaching in the Sommerfelt reference. Claim 1 is therefore in allowable form. Claims depending from claim 1 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Claim 8, as amended, recites in pertinent part: "A capacitor dielectric, comprising...a first high-K capacitor dielectric comprising a metallic element...and... a second high-K capacitor dielectric comprising said metallic element, having a lower oxygen density than said first high-K capacitor dielectric, and contacting said first high-K capacitor dielectric, *wherein the first high-K capacitor dielectric manifests a greater oxidation than would an equivalent thickness of the second high-K capacitor dielectric.*" (Emphasis added). Sommerfelt simply does not disclose, or even suggest this. Claim 8 is therefore also in allowable form. Claims depending from claim 8 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Claim 12, as amended, recites in pertinent part: "A capacitor dielectric, comprising...a first high-K capacitor dielectric comprising a metallic element...a second high-K capacitor dielectric comprising said metallic element and contacting said first high-K capacitor dielectric...wherein said first high-K capacitor dielectric and said second high-K capacitor dielectric are oxides...said first high-K capacitor dielectric contains a first amount of oxygen per

unit volume, and wherein said second high-K capacitor dielectric contains a second amount of oxygen per unit volume different from said first amount, *further wherein the first high-K capacitor dielectric manifests a greater oxidation than would an equivalent thickness of the second high-K capacitor dielectric.*" (Emphasis added). The Summerfelt reference simply does not disclose this. Claim 12 is therefore also allowable. Claims depending from claim 12 are also allowable based upon the allowable form of the base claim, and further in view of the additional limitations recited in the dependent claims.

Claim 13 presently recites: "A capacitor structure, comprising... a dielectric layer disposed over said first electrode layer, wherein said dielectric layer comprises a plurality of consecutively-positioned sub-layers, wherein each of said sub-layers comprises a high-dielectric-constant material, wherein said dielectric layer comprises an element common to all sub-layers of said plurality, and wherein one of said sub-layers is more oxidized than another of said sub-layers *so that at least one of the sub-layers of the dielectric layer manifests greater oxidation than would an equivalent thickness of an underlying sub-layer of the dielectric layer...*" (Emphasis added). Yet again, the Summerfelt reference simply does not disclose this. Claim 13 is therefore also allowable.

In view of the foregoing, Applicants respectfully request removal of all claim rejections based upon 35 U.S.C. §102(e).

§103 Rejection of the Claims

Claims 5-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Summerfelt reference as applied to claims 1-4 and 8-13 above, and further in view of additional comments presented by the Examiner in the Office Action. The Examiner admits that the Summerfelt reference fails to disclose "...[a] plurality of dielectric layers defines a thickness at most 200 angstroms...wherein a dielectric layer has a thickness of at least 10 angstroms..." (*ibid.*, at page 4). Nevertheless, the Examiner asserts that the selection of thicknesses is obvious, since thicknesses for the layers may be readily determined by "routine experimentation". Although Applicants disagree that an optimization of layer thicknesses may result from a series of known and routine acts, Applicants respectfully submit that the Examiner's foregoing observation still does not address the shortcomings present in the Summerfelt reference.

For example, and referring again to the claims, amended claim1, upon which claims 5-7 depend, recites in pertinent part: “A substrate assembly, comprising...a plurality of high-K dielectric layers over said support surface, wherein a common metal is present in at least two adjacent layers of said plurality, *and wherein at least two layers of said plurality exhibit different degrees of oxidation so that at least one layer of the plurality of high-K dielectric layers manifests greater oxidation than would an equivalent thickness of an underlying layer of the plurality.*” (Emphasis added). Applicants again submit that the Summerfelt reference fails to disclose or fairly suggest this. Accordingly, claims 5-7 are also allowable over the Summerfelt reference.

In view of the foregoing, Applicants respectfully request removal of all claim rejection based upon 35 U.S.C. §103(a).

Allowable Subject Matter

Claims 52, 53 and 62 were allowed. The Examiner is thanked for his careful review of the present application and for his indication of allowable subject matter.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all

rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

GURTEJ S. SANDHU ET AL.

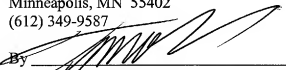
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19 June '07

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 19 day of June 2007.

Name



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